

Gut Microbiota – The Key to Treating Addiction?

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STORY AT-A-GLANCE

- › The gut microbiota significantly influences addiction vulnerability by affecting brain reward systems and neurotransmitter production, highlighting its potential as a target for addiction treatment
- › Stress and social interactions modulate addiction by altering gut microbiota composition, which in turn impacts the brain's reward pathways and addiction susceptibility
- › The gut-brain axis controls the communication between the gut and brain via the vagus nerve and microbial metabolites. Research shows this interplay influences addiction mechanisms, affecting mood and behavior
- › Emerging research suggests that microbiota-targeted therapies, such as probiotics and dietary interventions, could reduce addiction risk by restoring balance in the gut microbiome
- › Understanding gut-brain interactions aids in developing comprehensive addiction treatment strategies that address both biological and social factors, improving outcomes

Drug addiction is a complex disorder characterized by the compulsive use of substances despite harmful consequences to your physical and mental well-being. It affects various aspects of your life, including your relationships and ability to function in society.

Those who are struggling with drug addiction often experience a range of symptoms, such as intense cravings, withdrawal, and a preoccupation with obtaining and using the drug. Eventually, this disorder leads to severe health problems, including heart disease,

liver damage, and mental health issues like depression and anxiety. Without treatment, drug addiction escalates, making recovery increasingly difficult.

Beyond immediate health risks, drug addiction leads to numerous other problems, including loss of employment, financial instability and the breakdown of social relationships. Understanding the multifaceted nature of addiction is crucial for developing comprehensive treatment strategies that address both the biological and mental factors involved.

In particular, one solution has presented itself to be a strong contender – probiotics from fermented foods due to its effects on the gut-brain axis.

How Your Gut Microbiota Plays a Role in Drug Addiction

A study published in *Neurobiology of Stress* found that drug addiction extends beyond the brain, involving external factors like the gut microbiota, which influences an individual's susceptibility and the development of addictive behaviors.¹

The researchers also delved into how stress and social behaviors, both closely tied to the intestinal microbiota, serve as powerful modulators of the brain reward system. By examining the “microbiota-stress-immune axis,” the study aims to contribute to a meaningful way of treating drug addiction.²

From the analysis, it was revealed that the gut microbiota plays a crucial role in regulating brain reward processes, positioning it as a potential target for addiction interventions. Essentially, changes in the gut microbiota caused by drug abuse were shown to contribute significantly to the development of substance use disorders (SUDs), which is another term³ for drug addiction.⁴

One of the key mechanisms identified involves the gut microbiota's interaction with the vagus nerve, which acts as a communication highway between the gut and the brain. This pathway, along with cytokine production and the release of microbial metabolites that cross the blood-brain barrier, influences the dopaminergic system – a critical pathway in the brain's reward and pleasure centers.⁵

Specifically, stressful events were found to negatively impact the brain's reward system, altering reward sensitivity and highlighting the necessity of this system in coping with stress-related behaviors. In addition, environmental stressors also lead to long-term changes in the brain's reward function, further complicating addiction dynamics.⁶

Other Factors That Influence Drug Addiction

Social factors also play a significant role – both good and bad. Positive social interactions protect individuals from excessive physiological stress responses, which prevents the development of stress-related pathologies that lead to drug addiction. Conversely, negative social interactions act as powerful triggers that lead to substance use disorders:⁷

“A crucial consideration in the progression of drug addiction is often coupled with the social isolation and exclusion experienced by individuals struggling with addiction, making it difficult for them to reconnect with social circles.

This self-isolation is often arising from various factors such as fear of judgement, the stigma associated with addiction, exclusion from the social environment, or the co-occurrence of other brain disorders like anxiety or depression.

Feelings of social isolation and loneliness serve as aversive stimuli, contributing to perpetuation of drug use in drug addicts. This establishes a recurring cycle wherein individuals may use drugs as a coping mechanism for feelings of social isolation.”

Using this framework, the study linked the role of gut microbes to the development of social behaviors. In animal test models, altering the gut microbiota affected sociability and its underlying neurobiological foundations, suggesting that a healthy microbiome is vital for normal social functioning.

Moreover, administering specific probiotics strains, such as *Lactobacillus reuteri*, was found to restore crucial brain chemicals like oxytocin. This restoration improved social

behaviors and enhanced the plasticity of brain regions associated with reward.⁸

Additionally, the gut microbiota's ability to produce neurotransmitters means it directly influences brain chemistry. These neurotransmitters are essential for mood regulation and significantly impact behavior, including the propensity for addictive behaviors.⁹

Tying everything together, the researchers highlight that targeting the gut microbiota could revolutionize addiction treatment. By modifying the microbiome through diversification of probiotics strains by adding prebiotics and fermented foods into your diet, you'll be able to boost your mental health and ultimately curb addictive behaviors.¹⁰

Gut Bacteria – The Silent Communicators Influencing Your Mind

In an article by Maya Shetty, Research Lead for Stanford Lifestyle Medicine, she shows that depression and anxiety, which co-occur during drug addiction, are linked to gut health. Specifically, she notes that the gut microbiota produces important chemicals called neurotransmitters, such as serotonin and dopamine, which are crucial for regulating your mood and thinking processes.¹¹ These neurotransmitters travel from the gut to the brain, affecting how you feel and behave.

One of the key discoveries was how the enteric nervous system (ENS), often referred to as the "second brain," communicates directly with the central nervous system (CNS) in your brain, and any changes in your gut bacteria directly influence your mental state.¹² For example, when the balance of gut bacteria is disrupted, a condition known as dysbiosis, it impacts mental health.¹³

Shetty also highlighted how maintaining a healthy balance of gut microbiota supports overall mental health. A balanced microbiome helps keep your immune system in check and ensures that your gut barrier remains strong, preventing unwanted substances from causing inflammation that affect your brain.¹⁴ Conversely, a weak barrier allows harmful toxins to enter the bloodstream and reach the brain, impacting mental health.¹⁵

Another important aspect to the gut-brain axis is the role of short-chain fatty acids (SCFAs), which are produced by probiotics. SCFAs are shown to help repair and restore

neurons, the cells in your brain, which are damaged by inflammation or other harmful processes. Essentially, SCFAs play a protective role in maintaining brain health and preventing mental decline, and even protect against the impact of drugs that cause the symptoms of SUDs.¹⁶

Furthermore, research indicates that probiotics help reduce symptoms of mental health disorders. For example, individuals diagnosed with schizophrenia and bipolar disorder showed symptom improvement when taking probiotics, highlighting a potential connection between gut health and mental well-being.¹⁷

Other research also emphasized that the gut microbiota communicates with the brain through various pathways, including the production of neurotransmitters like GABA, which is essential for mood regulation and cognitive functions.¹⁸ Again, when the production of these neurotransmitters is affected by an imbalance in gut bacteria, it leads to significant changes in your mood and behavior.¹⁹

Furthermore, research has demonstrated that maintaining a balanced gut microbiome could prevent or even treat certain neuropsychiatric disorders. By ensuring a healthy gut microbiota through regular intake of fermented foods, you'll be able to reduce the risk of developing conditions like depression and schizophrenia, as well as SUDs.^{20,21}

Other Strategies That Will Help Support Your Mental Health

Based on the published research, it's clear that the probiotics play a crucial role in influencing your mood, as well as the way the reward system influences your behavior. To protect your mental health, the first and foremost strategy is nourishing your gut microbiome through natural means, but that's not all. A multifaceted approach is ideal, so all your bases are covered. Here are my recommendations:

- 1. Increase consumption of fermented foods** — Boost your gut health by adding more fermented foods to your diet. I strongly recommend making your own fermented vegetables and dairy at home for the best results. Foods like sauerkraut, kimchi and yogurt are rich in beneficial bacteria that support a healthy microbiome. Regularly

consuming these foods helps restore the balance of good bacteria in your gut, which improve mental well-being.

- 2. Manage stress effectively** – Reducing stress is essential for maintaining a healthy gut microbiota. High stress levels disrupt the microbial balance in your intestines, shifting it to a focus on pathogenic strains that lead to addictive behaviors and other health issues.

I recommend incorporating stress-reducing practices into your daily routine, such as meditation, yoga and deep-breathing exercises. Better yet, just get regular physical activity. By managing your stress, you support a healthier gut environment, which in turn helps regulate your mood and reduce the risk of addiction.

- 3. Limit linoleic acid (LA) intake** – All the healthy food you've been eating will be for nothing if you don't minimize your intake of LA, as it's a pernicious metabolic poison. It's important to limit your intake of linoleic acid to less than 5 grams a day. Vegetable oils, largely comprised of LA, disrupt the probiotics and promote harmful bacteria.

Throw away the vegetable oil in your pantry and cook with healthy fat sources like grass fed butter, ghee or tallow instead. By reducing your linoleic acid consumption, you help maintain a balanced and protective gut environment, which is crucial for preventing addictive behaviors and promoting overall health.

- 4. Minimize exposure to estrogens and EMFs** – Limiting your exposure to other metabolic toxins such as xenoestrogens and electromagnetic fields (EMFs) further protect your gut microbiome. **Avoid plastics and products that contain xenoestrogens** by choosing glass or stainless steel containers.

Additionally, **reduce EMF exposure** by keeping electronic devices away from your body and using EMF shields if necessary. By minimizing these environmental exposures, you support the integrity of your gut-brain axis, helping to maintain a healthy balance of gut bacteria and improve your ability to resist addictive behaviors.

Sources and References

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